

3 SHEET LAYOUT AND CLIPPING

OBJECTIVE

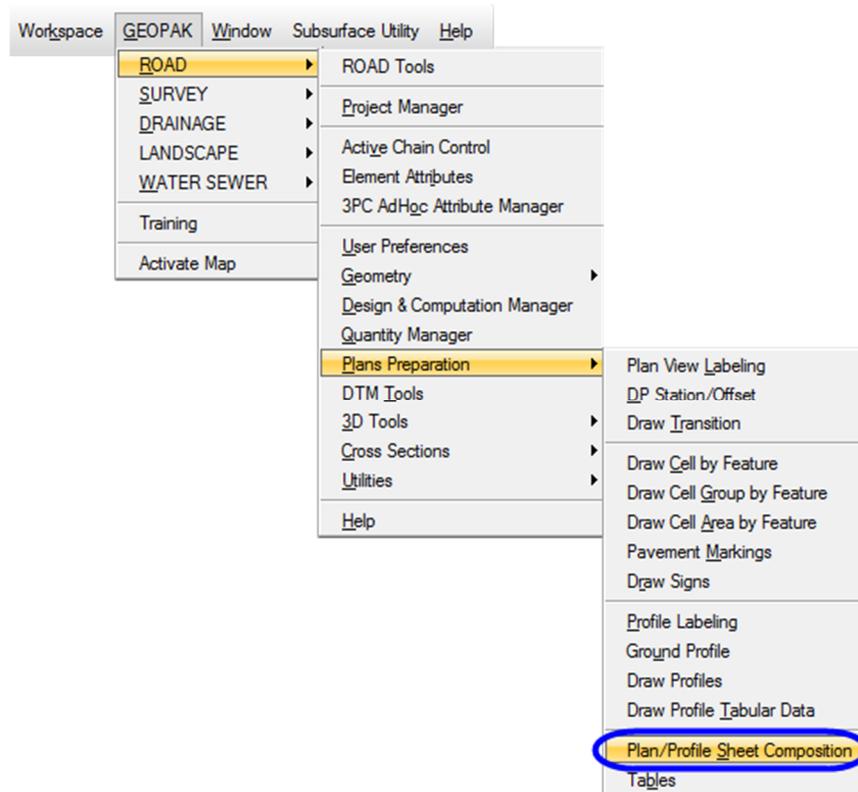
The objective of this chapter is to teach the designer how to layout and clip sheets.

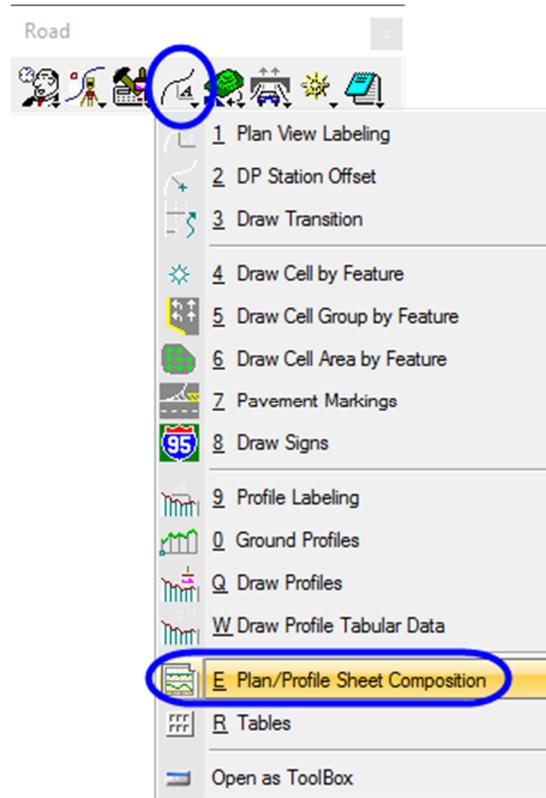
INTRODUCTION

Sheet clipping is, simply, a method to get the information that is in the design file onto a plan sheet. The CADD office recommends using GEOPAK's Plan/Profile Sheet Composition tool to automate the sheet clipping process.

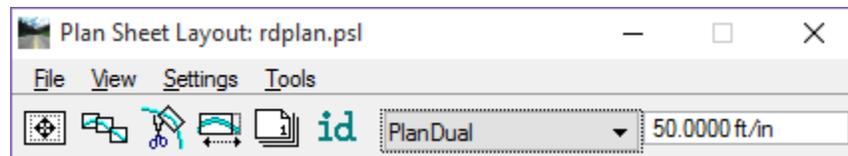
THE SHEET LAYOUT TOOL

The Plan Profile Sheet Composition tool can be accessed from the MicroStation menu, select **GEOPAK > Road > Plans Preparation > Plan/Profile Sheet Composition** or from the Road tools palette click the *Plan/Profile Sheet Composition* button.





Once activated the Plan Sheet Layout dialog opens as shown below.

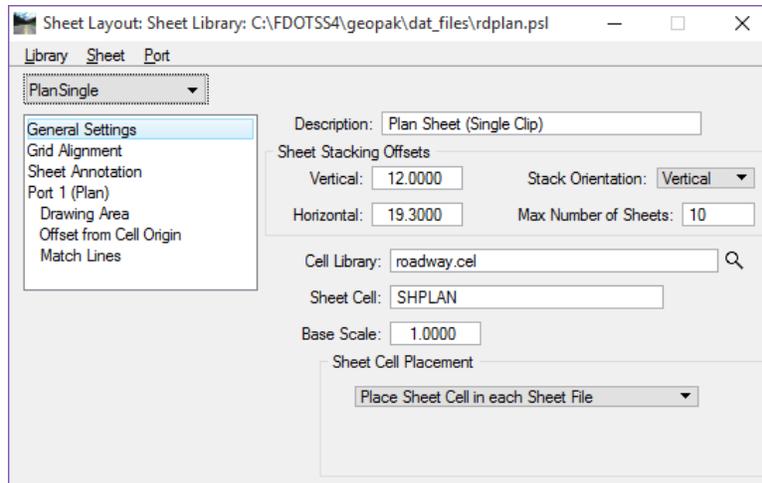


The Plan Sheet Layout tool uses an attached library that controls what sheet types are available. The Plan Sheet Library or *.psl* file is located in the `FDOTSS4\GEOPAK\dat_files` server folder.

FDOT delivers a group of these files, ready to use, that cover the most common of the sheet configurations used. By default, the *rdplan.psl* library is attached. The currently attached file is shown in the header of the dialog.

SHEET LIBRARY

The sheet library is accessed from the Plan Sheet Layout dialog menu **File > Sheet Library > Edit**. The Sheet Layout dialog displays as shown below.

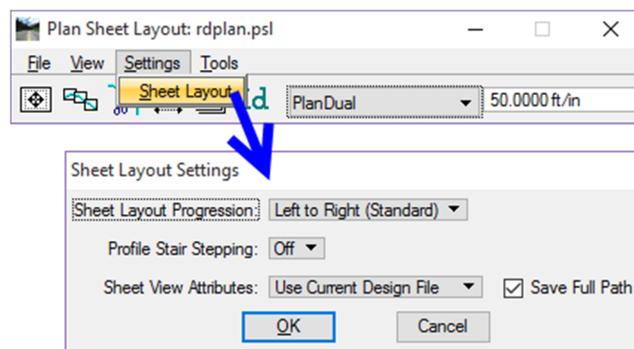


The most important parameters in Sheet Layout: Sheet Library dialog are the following:

- **Cell Library** – Make sure the correct cell library is attached.
- **Sheet Cell** – This is the name of the cell representing the border.
- **Sheet Cell Placement** – Select how the Sheet Cell, Border, is to be placed. Either Place the sheet cell in each file or place it once in a border reference file.

SHEET LAYOUT SETTINGS

The Sheet Layout Settings dialog can be accessed from the settings pull down on the Plan Sheet Layout dialog. This dialog instructs the sheet clipping to cut sheets a certain way. For example: is the clipping to go from Left to Right, is there a lot of elevation relief on the project, if so then set the stair stepping ON, and how is the sheet view attributes set up, use the current design file or a Motif file.

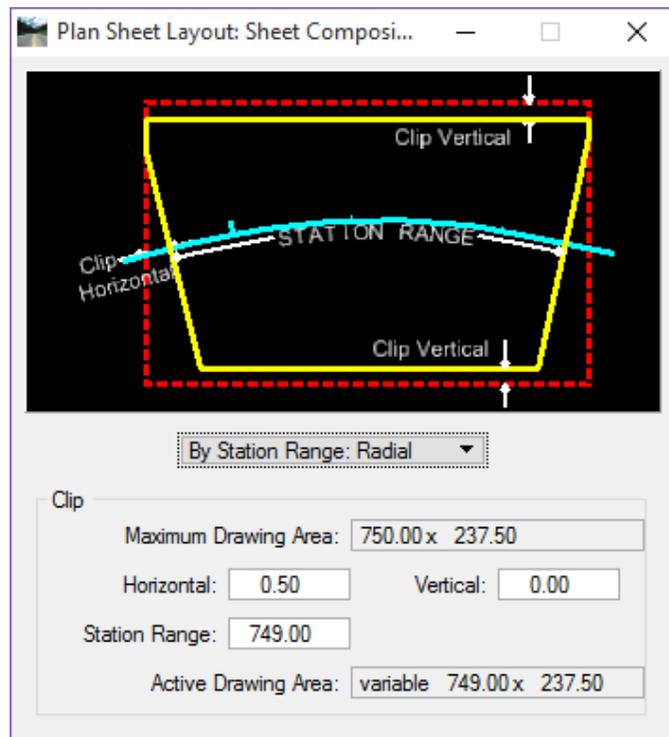


A Motif file is nothing more than a MicroStation design file with reference files attached and level symbology set up the way the plan sheets are to look when clipped (a settings file). FDOT has established a standard design file name *MTPLSP01.dgn*. Once the Motif file is created, attach the appropriate reference files and turn on or off the levels to make the file look the way the plan sheets are to look for the project. This is, also, where the designer can set up any level symbology that is required.

Note This should not be confused with Live Nesting.

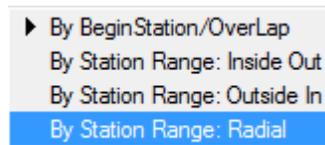
SHEET COMPOSITION

Sheet Composition controls how the limits of the sheets are handled.



The options are:

- By Begin Station/Overlap
- By Station Range: Inside Out
- By Station Range: Outside In
- By Station Range: Radial

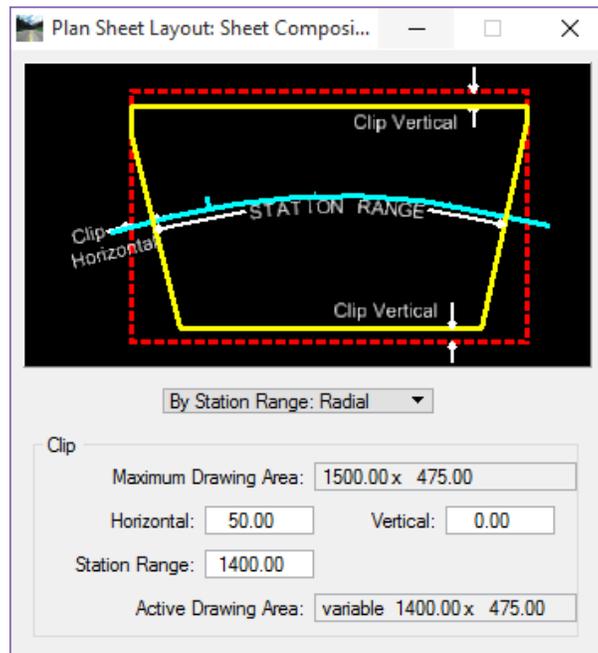


The *Station Range* is a factor of the Clipping Scale. Look in the **Plans Preparation Manual (PPM), Volume 2, Chapter 10**, for the values to be used in the *Station Range*. These values are filled in based on the scale entered, but may need to be adjusted to fix areas in sharp curves where portions of the design files are missed.

Note These four options are covered in detail in the *GEOPAK Help files*. In this training course, the class will use the option *By Station Range: Radial*.

BY STATION RANGE RADIAL

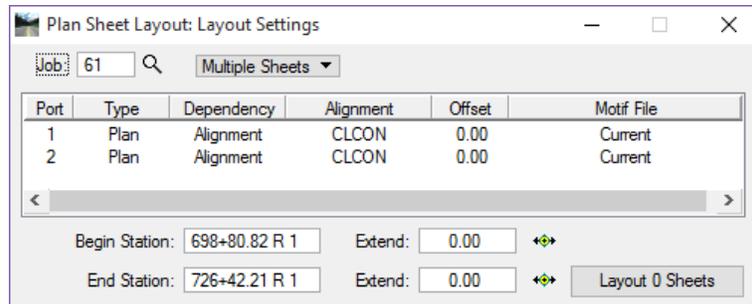
With this option the *Horizontal* distance is used to trim the Station Range. The Maximum Drawing Area, Horizontal and Station Range are inter-related. The resultant clipping shapes are not rectangular; instead, the Vertical edges are oriented perpendicular to the alignment, which results in rectangular shapes along tangent sections and more of a trapezoidal shape along curved sections. Adjusting the Station Range will alleviate the pie shaped wedges along curves.



- The critical value in this option is the **Station Range**. This should be set based on the standards delivered in the PPM. For example, for 100 scale sheets the Station Range should be set to 1400. This is the maximum value and may be decreased to handle alignments with unique conditions like sharp curves or intersections.
- **Horizontal** is used for the clipping limits at the ends of the sheet. If you adjust the Horizontal distance the Station Range will dynamically change by the Horizontal distance times 2.
- **Vertical** sets an additional clip limit from the defined sheet width. In the figure above, the red dashed rectangle represents the Maximum Drawing Area. Entering a value other than zero will reduce the clip limit by this amount.

SHEET LAYOUT

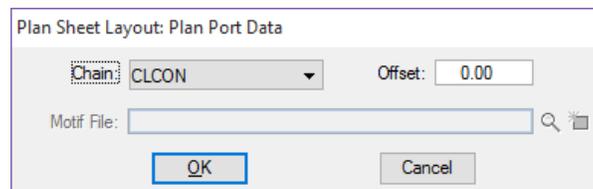
The Sheet Layout dialog is used to define the Ports, clipped areas on a sheet, and the station range to layout the clip borders.



- **Job** – This is the GPK. If Project Manager is used, this will be filled in automatically. If Project Manager is not used the job will have to be selected using the magnifying glass icon.
- **Multiple Sheets** – Used for clipping more than one sheet.
- **Single Sheet** – Used for clipping only one sheet.

Note This option is often used for Signalization Plans where only the intersections are shown on the plan sheets. The scale should not be smaller than 1" = 50'.

- **Port** – In a Plan/Profile scenario Port 1 is the Plan view and Port 2 is the Profile. For Plans that are Double Stacked with two plan views, both Port 1 and 2 are Plan.
- Double Clicking on one of the **Plan** ports opens the Plan Port Data dialog as seen below. This is where modifications are made to set up the Layout Settings dialog.

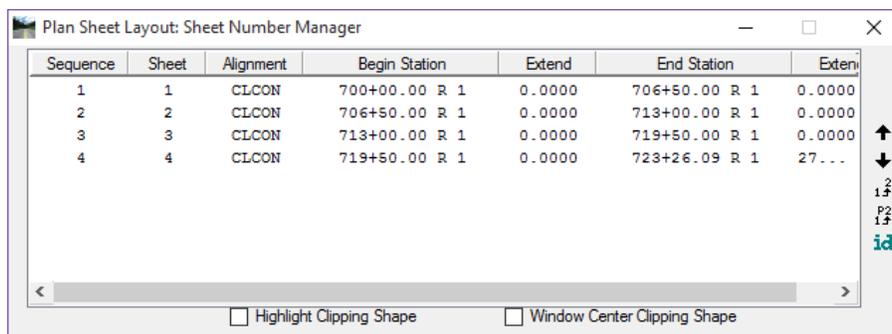


- **Type** – This is either the Plan or Profile area. In a scenario like Traffic Plans there will only be a Plan port.
- **Dependency** – This instructs the Port to either be dependent on an Alignment or another port.
- **Alignment** – This is a GEOPAK chain that the sheets are clipped along.
- **Offset** – This allows the designer to set the clip borders at an offset from the Alignment.
- **Motif File** – This shows whether a separate motif file is used and if so what the name is.
- **Begin and End Station** – This defines where the first sheet starts and the last sheet ends. Either key-in the values or use the Select icons to dynamically select the stations. It is highly recommended to select an even station or snap to an even tick mark for the begin station so that the sheets will all fall on even stations.
- **Extend** – To start the first sheet at a defined distance prior to the Begin Station. This is good for leaving space for General Notes or additional design before the Begin Station. The same applies for the End Station.
- **Layout Sheets** – This button will show the number of sheets needed based on the Begin and End Stations. Clicking this button will draw the clip borders into the active design file.

SHEET NUMBER MANAGER

Sheet Number Manager provides a method for modifying sheet and sequence numbers on the clip borders. The main window contains a list of the sheet borders contained in the file. In the case of dual clip borders for a single sheet, i.e. Plan/Profile sheets, the borders are grouped together and only listed once in this window. Select a line in the window, click the up and down arrow buttons to move the Sheet in the sequence order. The next two buttons allow for the manual editing of sequence and sheet numbers. The *ID* button is used to graphically select a sheet to modify. Select the *Highlight Clipping Shape* check box or *Window Center Clipping Shape* if applicable.

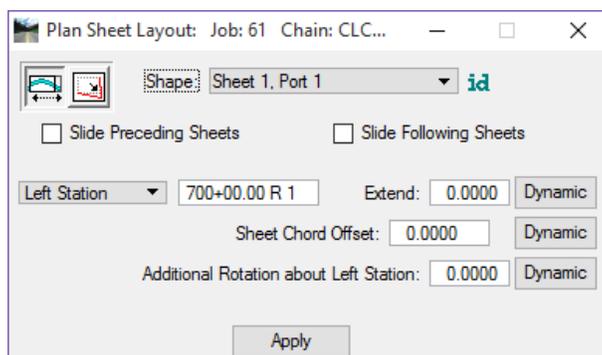
Keep in mind that this is the MicroStation design file name for the sheet not the actual sheet number that is placed in the title block. Knowing this, you should always run Sheet Number Manager and add a Prefix of '0' to the sheets so when the sheets are clipped the file names will be, as an example: *Plansp01.dgn* not *Plansp1.dgn*. This will make organizing and managing the files in explorer much easier.



Note The Sheet Number can be modified to match the sheet number in the plans for easy reference when locating a sheet within a file to open.

MODIFY SHEETS

This allows the clip sheet borders to be adjusted prior to actually clipping the sheets. The Sheet Modify command opens Plan Sheet Layout: Modify, which operates in two modes, *Slide Sheets* or *Modify Drawing Area*, represented by the two buttons in the upper left corner. The following figure shows the *Slide Sheets* mode.

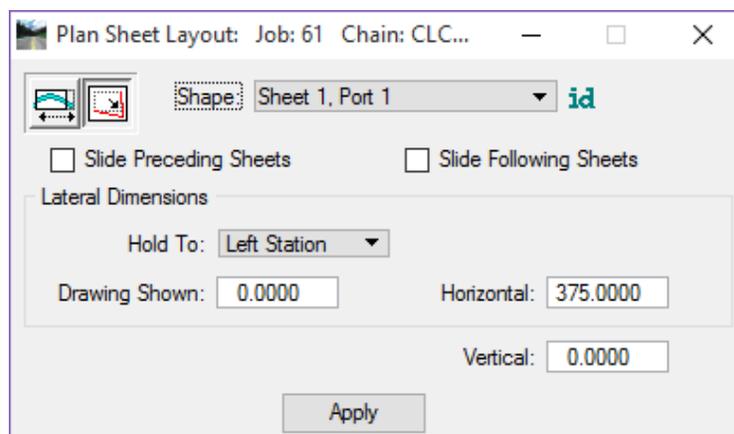


Slide Sheets is used to move the clip borders along the alignment. Type a specific station in the box and select the *Left Station*, *Center Station*, or *Right Station* to apply the new station. *Left Station*, *Center Station*, or *Right Station* refers to the portion of the clip border that is located at that station.

Another option is to change the *Sheet Chord Offset* of the border to allow the movement of the sheet parallel to the alignment in either direction for a given distance. *Additional Rotation* can also be applied. This angle is measured from the left station and is in reference to the alignment.

Perform any of these three actions dynamically with the *Dynamic* buttons to the right of the respective function.

Modify Drawing Area changes the composition of the borders. Type the appropriate dimensions in the *Drawing Shown*, *Horizontal*, and *Vertical* boxes, and then select *Left Station*, *Center Station*, or *Right Station* from the *Hold To* list.



In either mode, select which sheet is being modified from the *Shape* list, or click the *Identify* button to do so graphically. Select the *Slide Preceding Sheets* check box and/or the *Slide Following Sheets* check box to indicate if the sheets preceding and following the modified sheet are to slide to compensate for the changes made to the current sheet border. To make any changes effective, click the *Apply* button.

CLIP SHEETS

This option within the tool clips the plan sheets based on all of the previous settings.

- The Output File section allows the designer to specify where sheet files are created and what to name them.
- Directory – Select the path where the new sheet files are to be placed.
- Sheet Name Prefix – Type the name of the sheet file. Type only the first part of the file name; the software supplies a numerical suffix that corresponds with the sheet number assigned to the clip border(s). For example, if PLANSP is entered as the prefix, as the sheets are clipped the files are named PLANSP01.DGN, PLANSP02.DGN, PLANSP03.DGN, etc.
- Rotate Reference or Rotate View – Rotate Reference rotates the reference files to be attached to the orientation of the plan sheet border and should be used when stacking more than one sheet per file. Rotate View rotates the plan sheet border to the orientation of the clip borders and is generally used when only one sheet per file is used.
- Sheets per File – Type the number of sheets to be created in each design file.
- Sheet Range Begin and End - Select the range of sheets to be created from the clip borders.
- Labels and Annotations allows the designer to enter a Sheet Title and Project Number, as well as Match Line text when applicable. This information cannot be entered and will be grayed out if the annotation information is not set up in the Sheet Library.

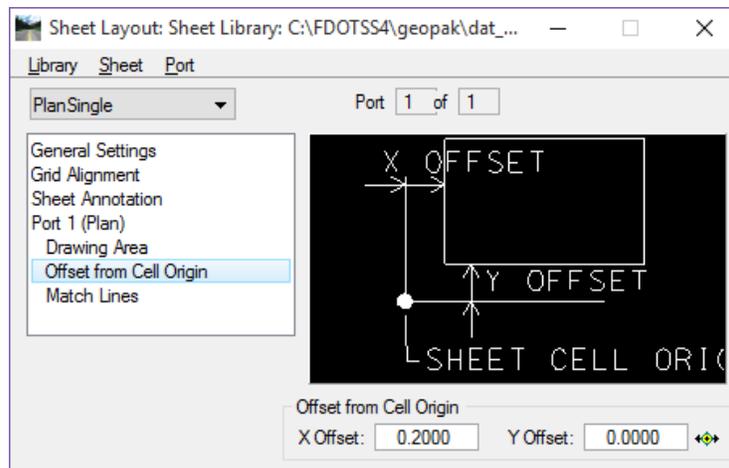
Note Typically, this section is not used to label the sheets. Sheet Navigator is recommended to fill in this information on the sheets.

- **Process Sheets** – This button starts the sheet clipping process.

SHEET LIBRARY ITEMS

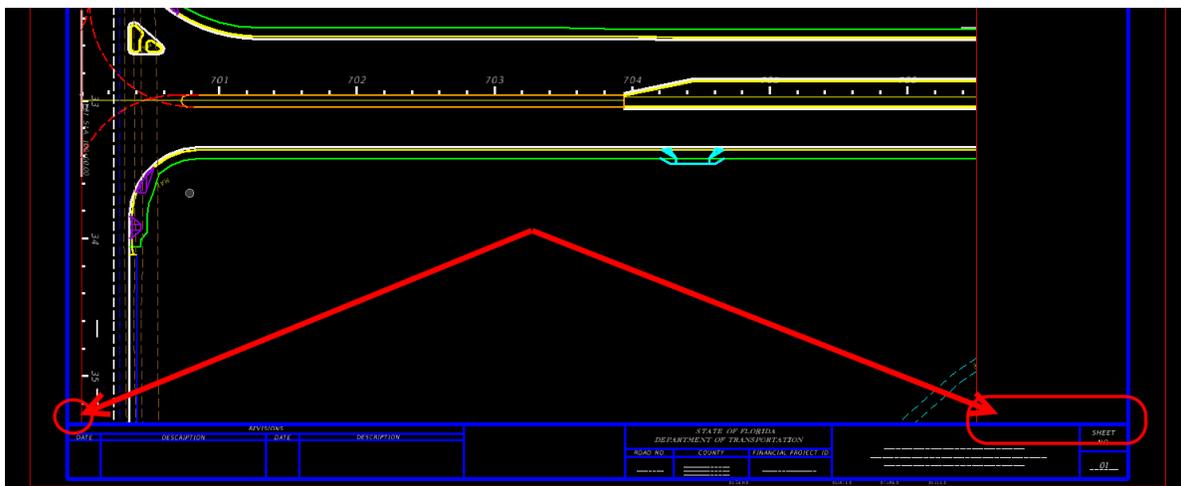
There are some settings in the sheet library that may need to be adjusted to make the plan sheets look correct. For example, if after the sheets are clipped and the offset for the left edge of the border to the clip limit is too small this can be adjusted in the library and the sheets re-cut.

The figure below shows the Offset from Cell Origin as 0.200. This value is based on master units (survey feet) measured on the plan sheet cell at a scale of 1. When the sheets are clipped, the space from the left edge of the border to where the clip sheet starts may be too small.

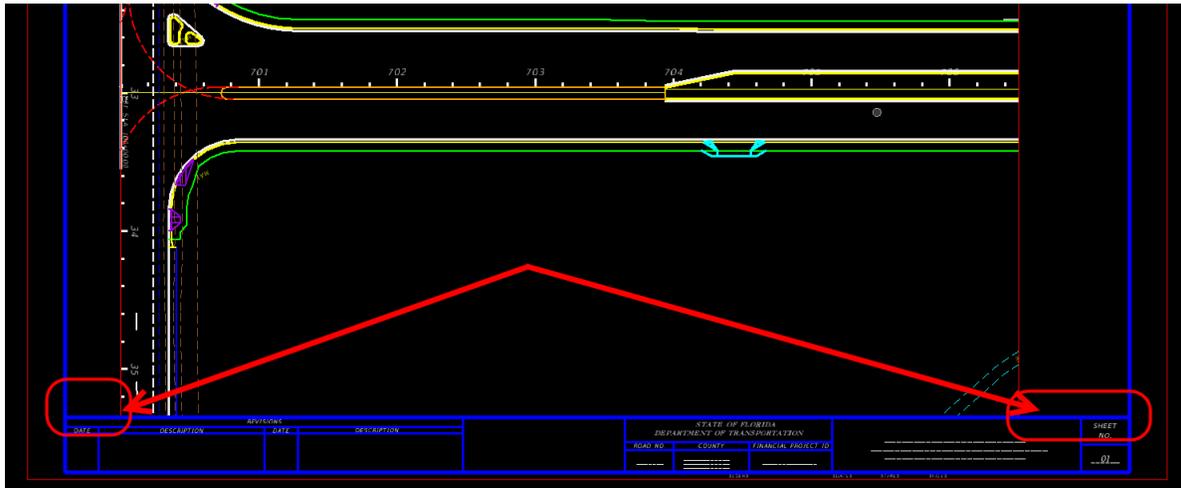


Note The defaults set up in the *rdplan.psl* are based on horizontal and vertical offsets being set to 0 on the Plan Sheet Layout: Sheet Composition dialog. If these settings are modified, it will result in the clipped area being off center on the sheet. To correct this, the Offset from Cell Origin will need to be adjusted in the Sheet Library.

The image below shows the panel with the Offset from cell origin set at 0.200. Changing this value to 0.800 will shift the clip area over to a much better looking condition.



The figure below shows the results after changing the Offset from Cell Origin.



Exercise 3.1 *Sheet Clipping*

➤ *Sheet Clipping (Part 1) – Border Setup*

In this exercise, the student will create the Clip Border file and Plan Sheet Border.

✓ *Open Border Sheet design file*

1. Open the *Border Sheet*, **Bdplsp01.dgn** created in chapter 1.
2. Set the *Plot Scale* to **1.00**. No need to place a sheet border at this time, the sheet clipping process will place the border sheet cell.

✓ *Set up Motif design file*

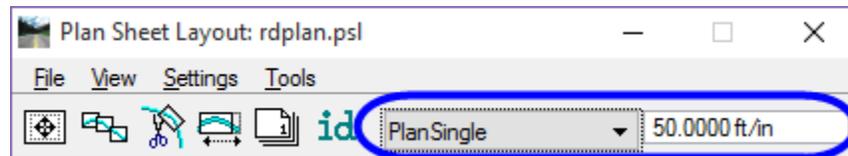
1. From the FDOT Menu, select **Actions > Create Files** to load the **Create File/Project** application.
2. Using what you have learned in this course guide create the *Motif File for Plan Sheets* file. Create the file in the **Signing** folder using the **Signing & Pavement Marking Files** Group. Refer to chapter 1 in this training guide for assistance if needed
3. Reference in the **Algnrd01.dgn (Algnrd_50 model)**, and **Dsgnrd01.dgn (Default model)** from the *Roadway* folder. Reference in the **DSGNSP01.dgn** file from the working directory, *Signing*.
4. Turn off any levels that should not be shown on the plan sheets.
5. **Fit View** and **Save Settings**.

✓ *Set up Clip Border design file*

1. From the FDOT Menu, select **Actions > Create Files** to load the **Create File/Project** application.
1. Using what you have learned in this course guide create the *Clip Borders* file. Create the file in the **Signing** folder using the **Signing & Pavement Marking Files** Group. Refer to chapter 1 in this training guide for assistance if needed.
2. Open the new file **Clipsp01.dgn**. Plot Scale in this file is not critical because it is only for laying out clip borders, no text or line work goes in this file; however, you may set it.
3. Reference in the **MTPLSP01.dgn** with Live Nesting set to Depth of **1** and the **Display Overrides** option to **Never**.
4. **Fit View** and **Save Settings**.

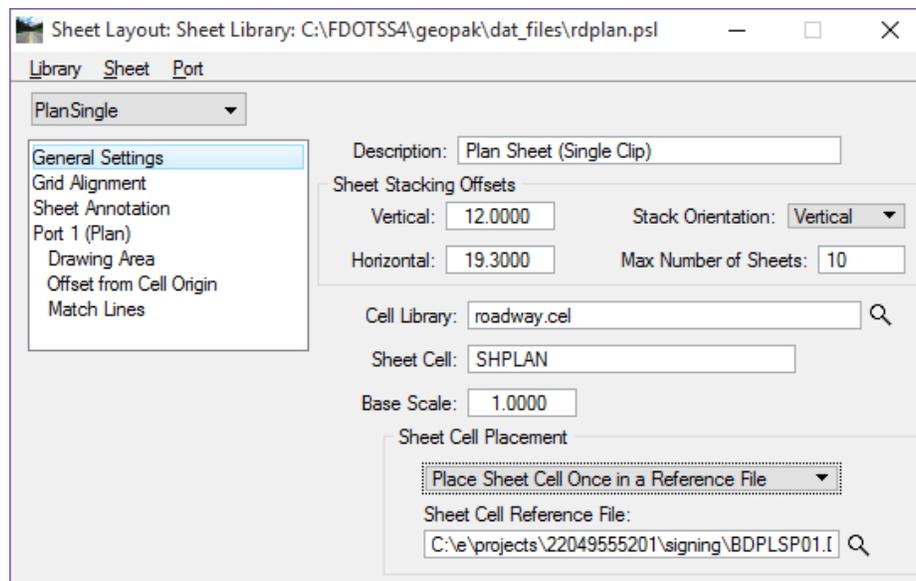
✓ Start Plan Sheet Layout Tool

1. Continuing in *Clips01.dgn*, select Plan/Profile Sheet Composition from the GEOPAK Road tools palette or from the GEOPAK > Road > Plans Preparation > Plan/Profile Sheet Composition pull down.
2. In **Plan Sheet Layout**, select the **Sheet Type: PlanSingle**. This is the drop down menu on the right hand side of the dialog.
3. Set the *Scale* to **50.00**. This is next to the sheet type.



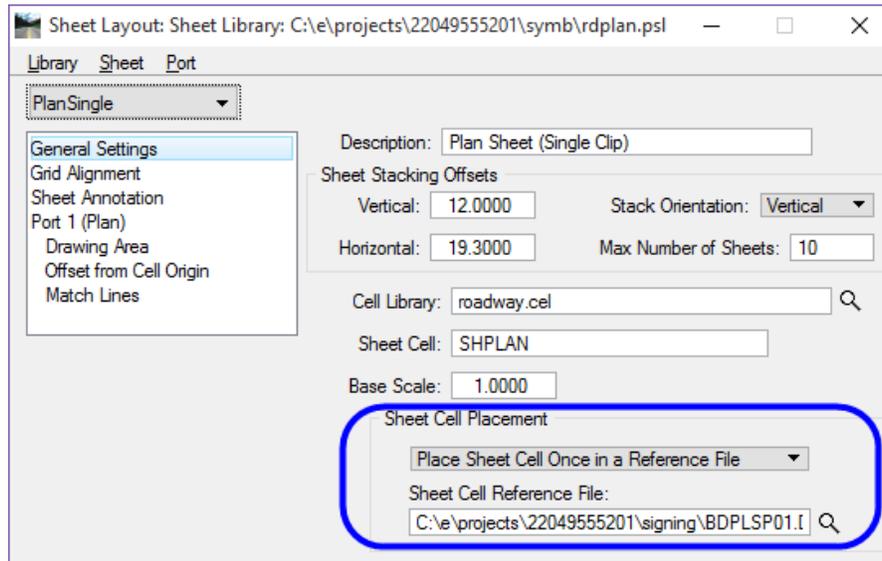
➤ **Sheet Clipping (Part 2) - Sheet Settings**

1. In Plan Sheet Layout select **File > Sheet Library > Edit**. This opens Sheet Library.

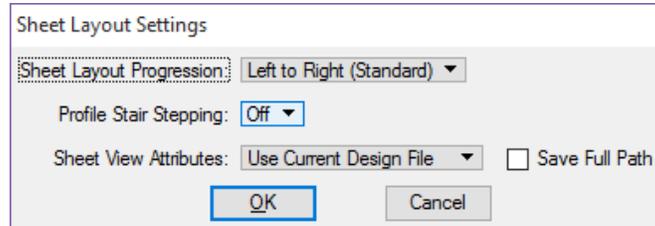


2. Select Library > Save As to save the psl file to the project Symb directory.

3. In the *Sheet Cell Placement* portion of the dialog, select **Place Sheet Cell Once in a Reference File**. Use the magnifying glass icon to browse to the border sheet created earlier.



4. Close Sheet Library by clicking on the X in the upper right hand corner.
5. Click **Yes** to save the changes to the Sheet Library.
6. In Plan Sheet Layout, select **Settings > Sheet Layout**. This opens Sheet Layout Settings.

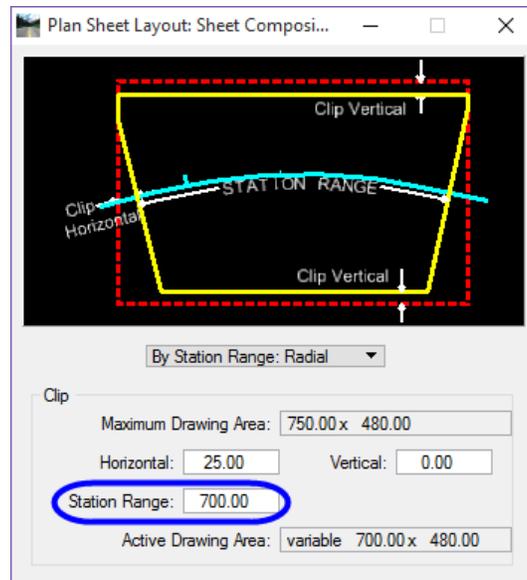


7. Set *Sheet Layout Progression* to **Left to Right (Standard)**.
8. Set Profile Stair Stepping to **Off**.
9. Set *Sheet View Attributes* to **Use Current Design File**.
10. **Uncheck** the *Save Full Path* toggle.
11. Click **OK**.

➤ **Sheet Clipping (Part 3) – Sheet Layout**

✓ Sheet Composition

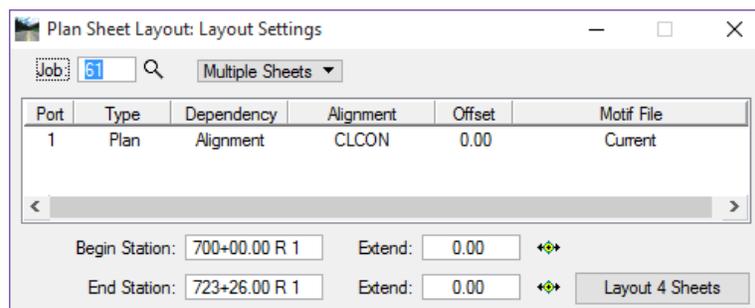
1. Open Sheet Composition . This can also be loaded from the **Tools** menu.
2. Set the *Method* to By Station Range: Radial.
3. Set the *Station Range* to **700.00**. This will automatically set the **Horizontal** clipping to **25.00**.



Note Close Sheet Composition.

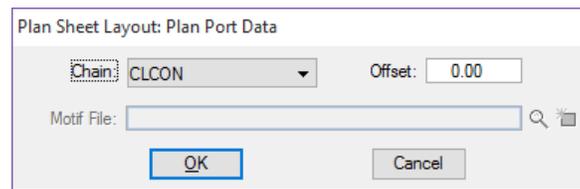
✓ Layout Sheets

1. Click the **Sheets Layout** icon  or select from the **Tools** menu.



2. The *Job Number* should be set to **61**. If not, you will have to browse and select the **61 gpk file**.
3. Set the *Method* to **Multiple Sheets**. The options are Single or Multiple.

4. Double click on **Port 1**. This opens Plan Port Data.



Plan Sheet Layout: Plan Port Data

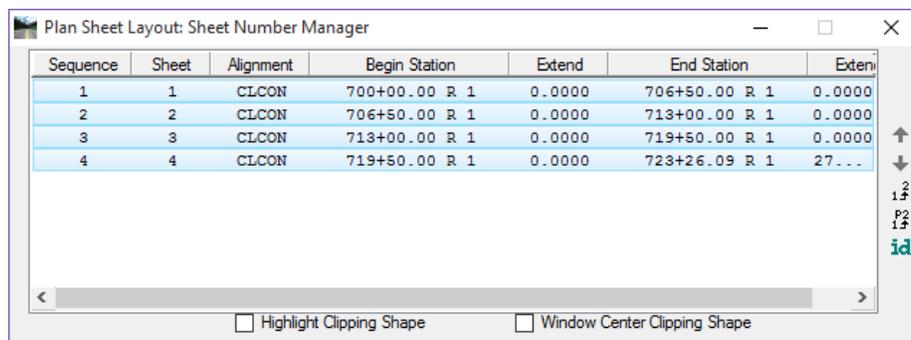
Chain: CLCON Offset: 0.00

Motif File:

5. Set the *Chain* to **CLCON**.
6. Set the *Offset* to **0.00**.
7. Click **OK**.
8. Click the **Layout 4 Sheets** button. This will draw the clip shapes into the design file.
9. Close Layout Settings.

➤ **Sheet Clipping (Part 4) - Sheet Number Manager**

1. Click the **Sheet Number Manager** button . This opens Sheet Number Manager.

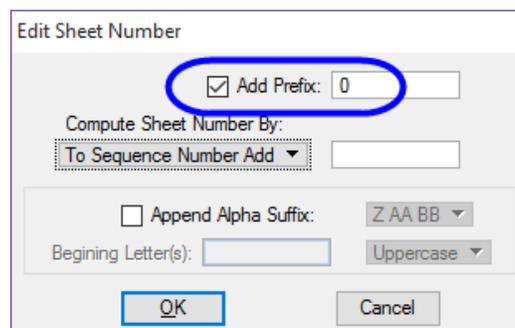


Plan Sheet Layout: Sheet Number Manager

Sequence	Sheet	Alignment	Begin Station	Extend	End Station	Extend
1	1	CLCON	700+00.00 R 1	0.0000	706+50.00 R 1	0.0000
2	2	CLCON	706+50.00 R 1	0.0000	713+00.00 R 1	0.0000
3	3	CLCON	713+00.00 R 1	0.0000	719+50.00 R 1	0.0000
4	4	CLCON	719+50.00 R 1	0.0000	723+26.09 R 1	27...

Highlight Clipping Shape Window Center Clipping Shape

2. Select the sheets by clicking and dragging across them.
3. On the right hand side of the dialog, click the **Edit Sheet Number** button . This opens Edit Sheet Number.



Edit Sheet Number

Add Prefix: 0

Compute Sheet Number By:

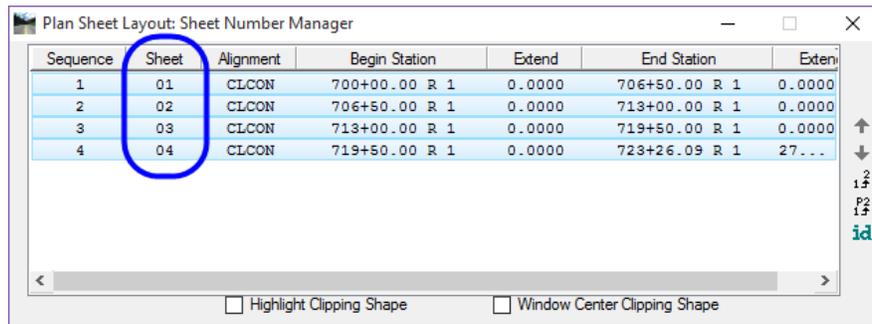
To Sequence Number Add

Append Alpha Suffix: Z AA BB

Beginning Letter(s): Uppercase

4. Toggle **ON Add Prefix**.
5. Enter a **0** for the *Prefix*.

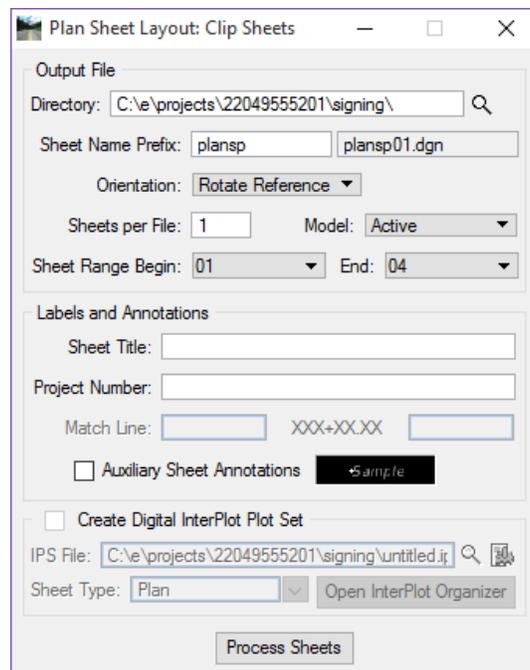
- Click **OK**. This will change the *Sheet Number* to 01.



- At the bottom of the Sheet Number Manager dialog, toggle **ON** *Window Center Clipping Shape*.
- Select **Sheet 01**. This will zoom and center on sheet 1.
- Take a moment to familiarize yourself with this function.
- Close Sheet Number Manager.
- Click **Yes** to Save Sheet Number changes.

➤ **Sheet Clipping (Part 5) - Clip Sheets**

- Click the **Clip Sheets** button  to open Clip Sheets.



- For the *Directory*, use the magnifying glass to browse to the project *Signing* folder.
- Sheet Number Prefix* enter **plansp**. The full file name will appear to the right of the prefix space.
- For *Orientation*, select **Rotate View**. The options are Rotate View or Rotate Reference. This is a personal preference.

5. Set the Sheets per File to **1**.
6. Set the *Model* to **Active**.
7. Sheet Range Begin set to **01**.
8. *End* set to **04**.

Note The sheet range settings allow you to select a range of sheets to clip in case you do not want to clip all of the sheets at this time. This is useful as a check to make sure all of the settings are the way you want them before clipping a mass number of sheets. **Labels and Annotations** will be grayed out, as seen in the figure above, if the options are cleared in the sheet library. If they are active, it is not necessary to fill them in as you will use *Sheet Navigator* to populate the title block.

9. Click **Process Sheets**. This will start the sheet clipping process.
10. Close Clip Sheets.
11. Open *Plansp01.dgn* in the *Signing* folder.
12. Take a moment to review the sheet and reference files and level settings. If the settings are unacceptable, go into the Motif file to fix them and save settings. The level change will show up in the plan sheet files.
13. Close Plan Sheet Layout.

4 Miscellaneous Sheets

OBJECTIVE

This chapter will teach the designers how to create miscellaneous sheets using the FDOT CADD resources.

- General Notes
- Special Details sheets

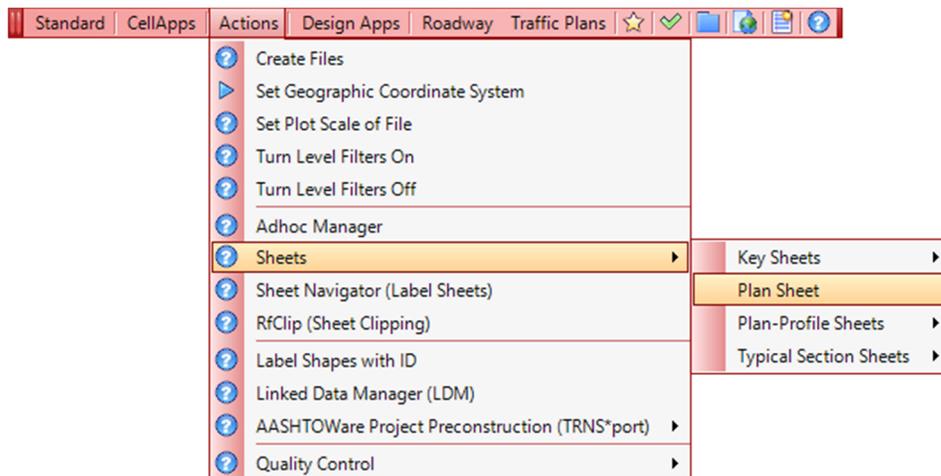
INTRODUCTION

Creating the General Notes sheet is now done through Linked Data Manager (LDM) and is a very simple process. Use the **Create File/Edit** tool to create the design file, use the FDOT Menu to place the sheet border and then use LDM to create the standard notes file and link it to the DGN file.

Exercise 4.1 *Create Signing & Pavement Markings General Notes Sheet*

In this exercise the student will create the General Notes design file, place the standard plan sheet border and place general notes on the sheet.

1. From the FDOT Menu, select **Actions > Create Files** tool.
2. Create and Open the file **GNNTSP01.dgn** in the *signing* folder.
3. Close the Create File/Project tool.
4. Set the *Plot Scale* to **1** and click the **Ok** button on the Plot Scale dialog.
5. From the FDOT Menu, select **Actions > Sheets > Place Sheet** to place the general notes sheet cell.

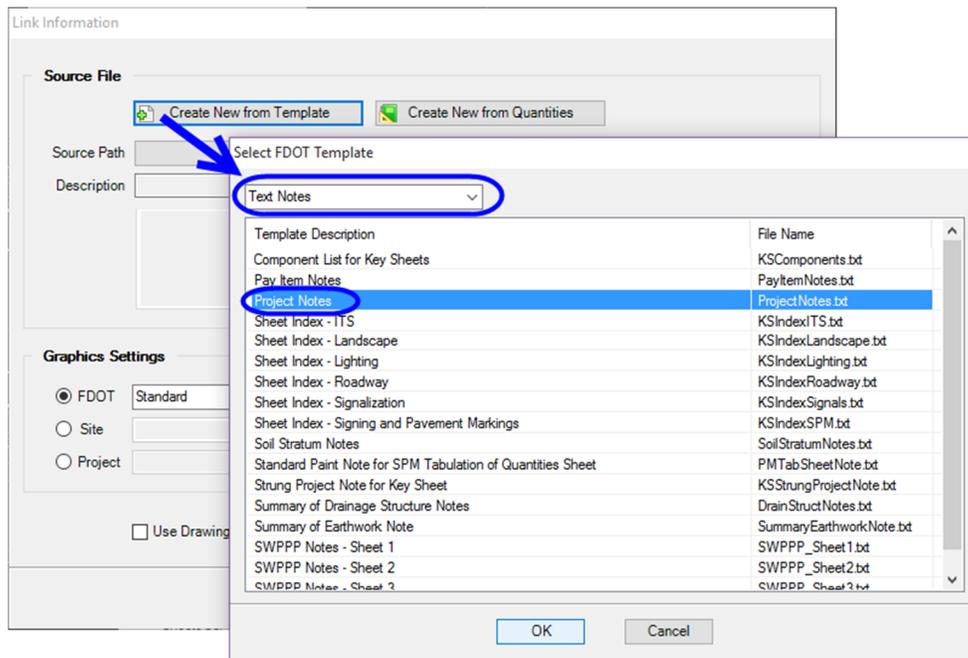


6. The sheet will be on the cursor. Place a **Data Point** in the design file to place the sheet cell.

7. From FDOT Menu, select **Actions > Linked Data Manager**.
8. Click the **Create New Link** button.



9. Click **Create New from Template** on the Link Information dialog.

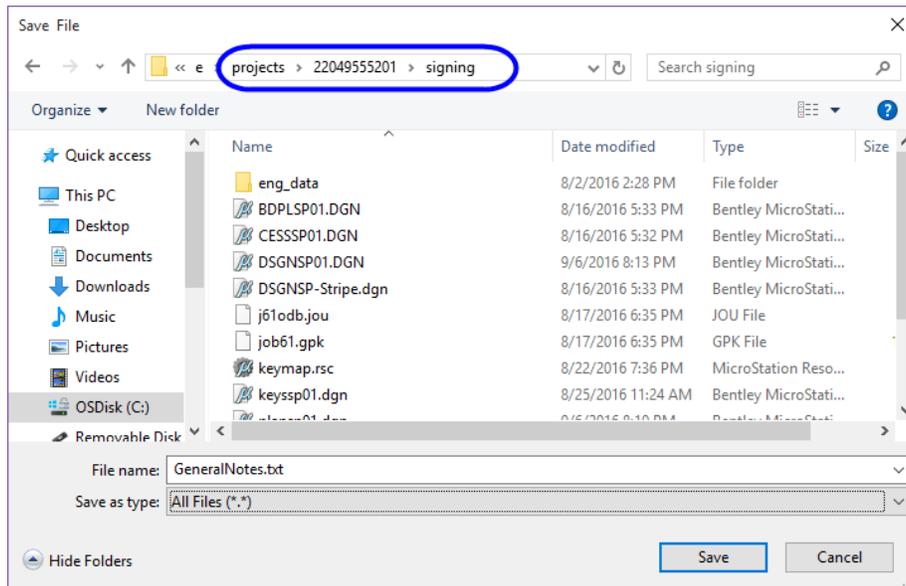


10. Select **Project Notes** from the list of *templates* on the Select FDOT Template dialog. (This file is available as a txt file or a docx file.)

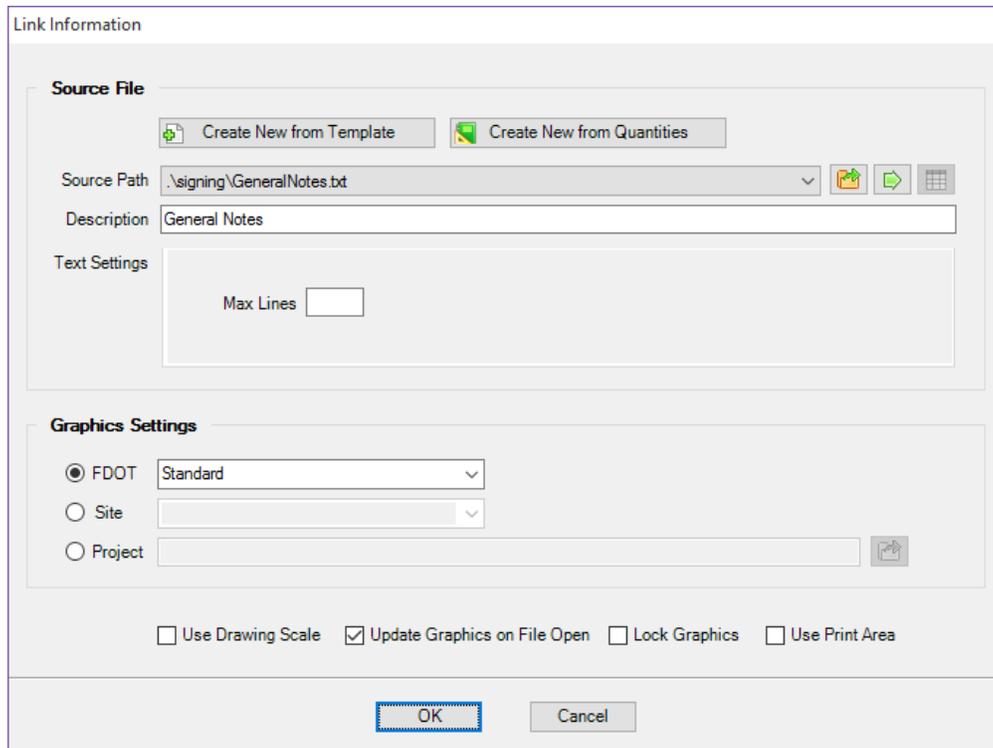
Note This template has the notes from the PPM for a Roadway component set of plans. It is being used to save time. Any Word or txt file file can be linked to the file with the project/component specific notes.

11. Click the **Ok** button to continue.

12. Save the **ProjectNotes.txt** file to the *signing* folder. This file can be renamed to GeneralNotes.txt.



13. Set the Link Information dialog as shown in the image below:



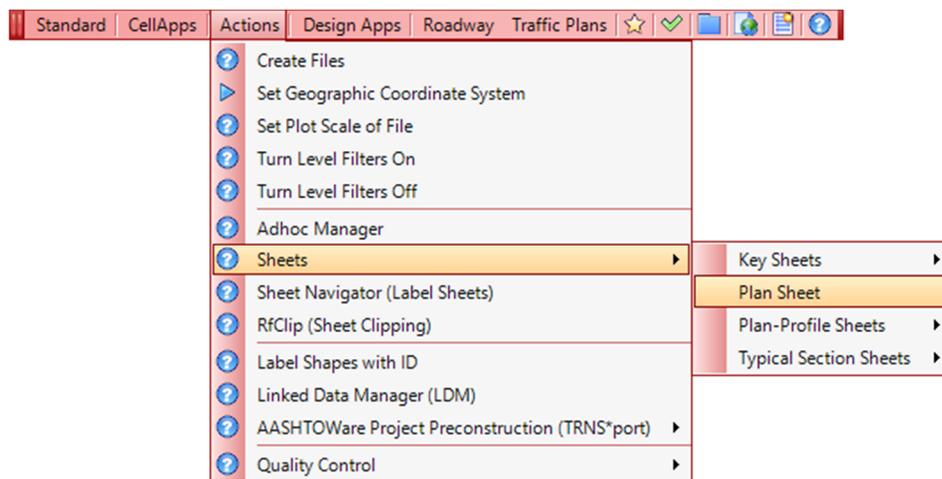
14. Click the **Ok** button to place the **General Notes** in the center of the **Plan Sheet** placed in **steps 5-6**.

15. Run Sheet Navigator to fill in the sheet border information.

Exercise 4.2 Create Standard Mast Arm Sheet

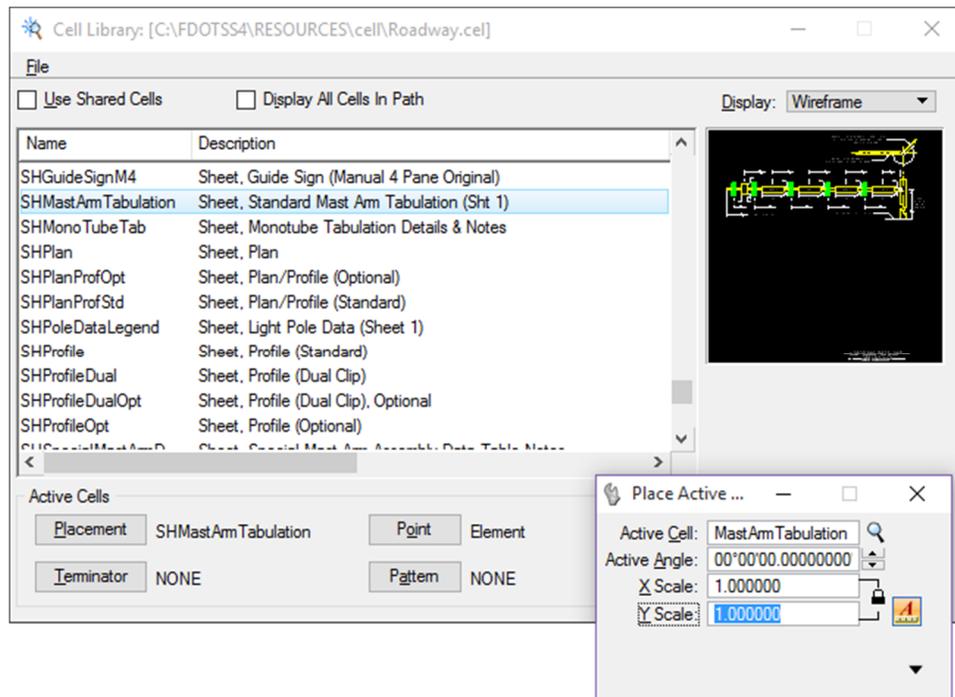
In this exercise, a Standard Mast Arm Tabulation Sheet will be created using the FDOT Menu, cells, and Linked Data Manager.

1. From the FDOT Menu, select **Actions > Create Files** tool.
2. Using the File Group: Signal Design Files, create and open the file **MSSGSG01.dgn** in the *Signals* folder.
3. Close the Create File/Project tool.
4. Set the *Plot Scale* to **1** and click the **Ok** button on the Plot Scale dialog.
5. From the FDOT Menu, select **Actions > Sheets > Place Sheet** to place the general notes sheet cell.

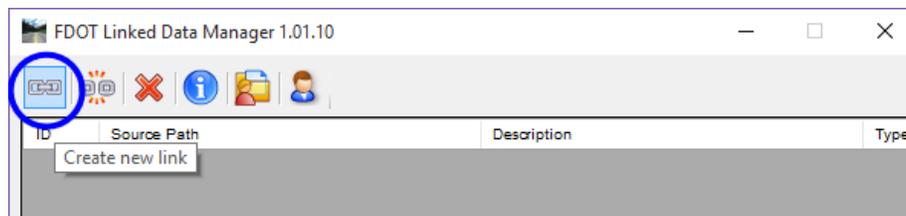


6. The sheet will be on the cursor. Place a **Data Point** in the design file to place the sheet cell.
7. Go to Element > Cells and open the Roadway.cel cell library using the File drop down list.

8. Scroll down to select the cell SHMastArmTabulation cell. Double click on the cell name to make the cell the active cell and open the Place Cell dialog. Ensure that the scale is set to 1 matching the plot scale used in step 4.

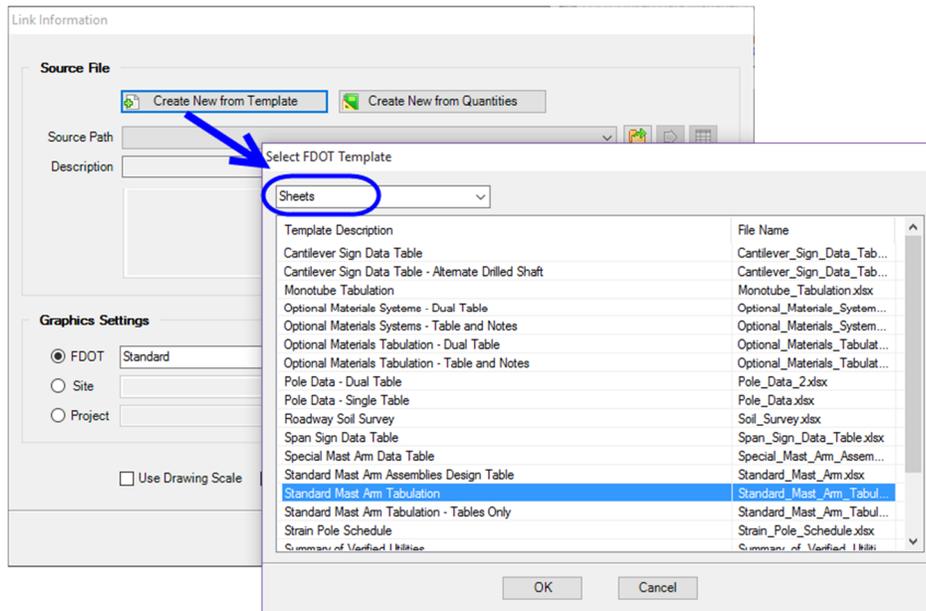


9. With the cell active and attached to the cursor, place a data point in the top left corner of the blue box of the plan sheet border to place the cell.
10. From FDOT Menu, select **Actions > Linked Data Manager**.
11. Click the **Create New Link** button.



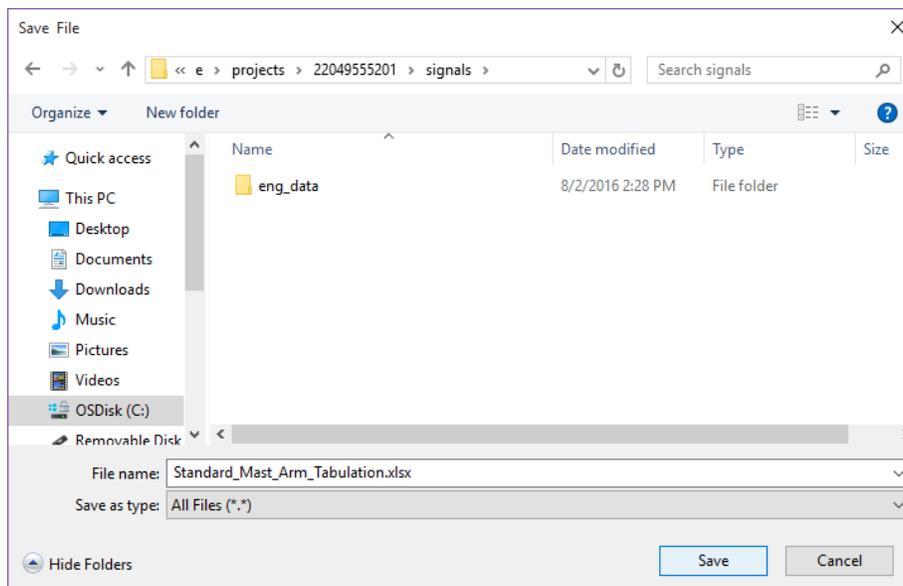
12. Click **Create New from Template** on the Link Information dialog.

13. Select **Sheets** from the drop down menu and then select Standard Mast Arm Tabulation from the list of *templates* on the Select FDOT Template dialog.



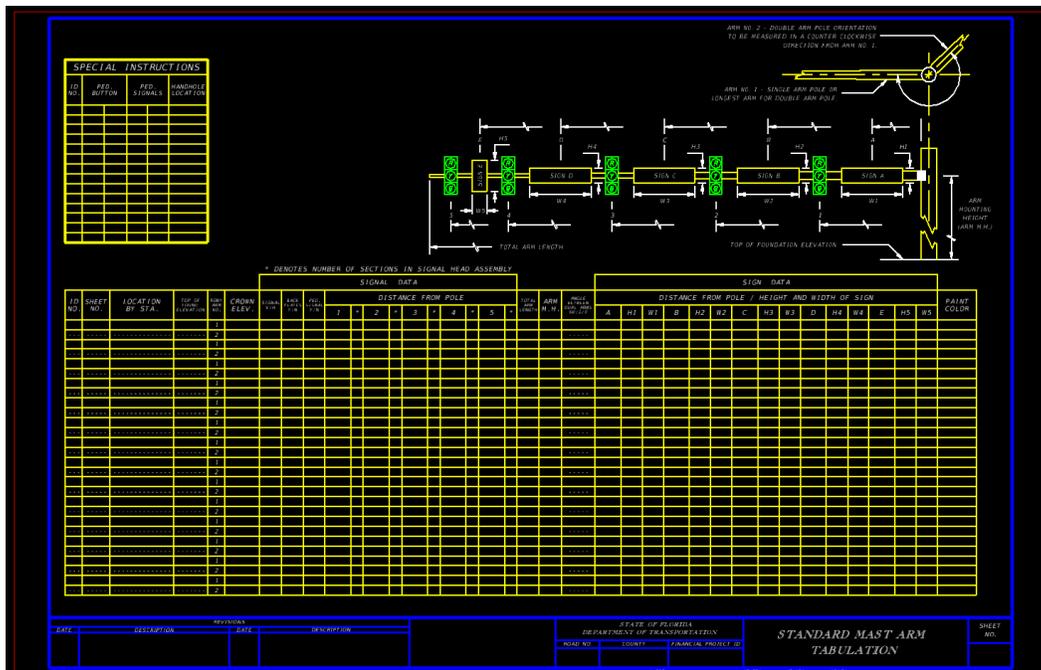
14. Click the **Ok** button to continue.

15. Save the **Standard_Mast_Arm_Tabulation.xlsx** file to the *Signals* folder.



16. Set the Link Information dialog as shown in the image below:

17. Click the **Ok** button to place the link. Place a data point in the top left corner of the blue box of the plan sheet border to place the cell.



18. Run Sheet Navigator to fill in the sheet border information.